sixty-one, or 86.56 per cent., were justified by winds of twenty-five miles or more per hour at or within one hundred miles of the station. Sixty-nine off-shore signals were ordered, of which number fifty-nine, or 85.51 per cent., were fully justified, both as to direction and velocity; sixty-three, or 91.30 per cent., were justified as to direction; and sixty, or 87.95 per cent., were justified as to velocity. Two hundred and fifty-five signals of all kinds were ordered, two hundred and twenty, or 86.27 per cent., being fully justified. These do not include signals ordered at display stations where the velocity of the wind is only estimated. Of the above cautionary off-shore signals thirty-six were changed from cautionary. Three signals were ordered late. In one hundred and twenty cases winds of twenty-five miles or more per hour were reported for which no signals were ordered.

COLD-WAVE SIGNALS.

There were one hundred and seventy-six cold-wave signals ordered during December, of which number, one hundred and thirty-four, or 76.1 per cent. were justified.

RAILWAY WEATHER SIGNALS.

Prof. P. H. Mell, jr., director of the Alabama weather service, in his December report, makes the following statement:

A careful examination of the meteorological reports from all quarters of the state shows the verification of the weather predictions to be 83 per cent., and of the temperature 90 per cent.

TEMPERATURE OF WATER.

The following table shows the highest and lowest temperatures of water at the several stations; the monthly ranges of water temperature; the average depth at which the observations were made; and the mean temperature of the air at the stations.

Temperature of water for December, 1884.

Station.	Temperature at bottom. Max.	Temperature at bottom. Min.	Range.	Average depth, feet and inches. ft.	Average depth, feet and inches. in.	Mean temperature of the air at station.
	°	°				°
Atlantic City, New Jersey	49.6	34.3	14.6	2	7	37.5
Alpena, Michigan*	32.7	29.7	3.0	11	7	23.2
Augusta, Georgia	54.1	40.8	13.3	9	1	50.7
Baltimore, Maryland	48.3	35.1	13.2	9	9	37.4
Block Island, Rhode Island	47.9	30.8	17.1	7	4	37.0
Boston, Massachusetts	38.9	30.4	8.5	21	4	33.1
Buffalo, New York*	38.9	32.4	6.5	10	11	29.8
Canby, Fort, Washington Territory†	49.3	33.6	15.7	17	11	36.5
Cedar Keys, Florida	67.6	55.0	12.6	9	8	60.7
Charleston, South Carolina	58.5	49.4	9.1	41	8	53.7
Chicago, Illinois*	35.9	31.8	4.1	6	11	28.4
Chincoteague, Virginia*	52.0	31.0	21.0	4	0	40.8
Cleveland, Ohio*	40.2	31.6	8.6	14	0	30.0
Detroit, Michigan*	39.7	33.0	6.7	23	3	30.5
Delaware Breakwater, Delaware	52.7	32.5	20.2	8	3	39.5
Duluth, Minnesota*	36.5	34.2	2.3	9	11	10.3
Eastport, Maine	43.1	38.7	4.4	15	0	26.3
Escanaba, Michigan*	38.2	32.9	5.3	17	0	19.7
Galveston, Texas	63.3	46.2	17.1	12	2	57.6
Grand Haven, Michigan*	35.0	39.2	5.8	19	0	28.4
Indianola, Texas	68.2	41.5	26.7	8	0	54.0
Jacksonville, Florida	62.5	58.8	3.7	18	0	58.4
Key West, Florida	78.9	70.7	8.2	16	10	73.0
Mackinaw City, Michigan*	39.1	31.5	7.6	10	0	25.1
Macon, Fort, North Carolina	59.3	43.0	16.3	6	9	48.8
Marquette, Michigan*	38.0	34.7	3.3	10	0	20.4
Milwaukee, Wisconsin*	37.3	34.3	3.0	8	0	22.7
Mobile, Alabama	59.1	49.6	9.5	14	9	53.9
New Haven, Connecticut	44.5	30.5	14.0	15	2	31.5
New London, Connecticut	46.4	38.3	8.1	11	7	34.5
New York City	44.0	34.0	10.0	15	6	34.6
Norfolk, Virginia	52.0	37.1	14.9	16	6	45.2
Pensacola, Florida	63.1	52.0	11.1	17	5	56 0
Portland, Maine	40.9	30.5	10.4	13	7	30.7
Portland, Oregon	45.4	31.4	14.0	53	9	31.0
Sandusky, Ohio*	39.5	34.0	5.5	8	11	30.9
Sandy Hook, New Jersey	47.5	34.6	12.9	2	0	36.1
San Francisco, California	55.2	51.0	4.2	34	4	52.5
Savannah, Georgia	56.8	47.8	9.0	10	0	54.4
Smithville, North Carolina	59.0	48.5	10.5	10	5	49.3
Toledo, Ohio*	36.4	32.4	4.0	11	9	30.0
Wilmington, North Carolina	56.7	43.0	13.7	19	6	51.2

* Observations interrupted by ice.—See text. † Record for 29 days.

Observations were interrupted by ice during the month as follows: Alpena, Michigan, from 17th to 31st; Buffalo, New York, from 19th to 28th; Chincoteague, Virginia, 20th; Cleveland, Ohio, on 9th, 15th, 18th, and from 20th to 31st; Detroit, Michigan, from 8th to 31st; Duluth, Minnesota, from 16th to 31st; Escanaba, Michigan, 14th, 15th, and from 18th to 31st; Grand Haven, Michigan, from 18th to 27th; Mackinaw City and Marquette, Michigan, from 18th to 31st; Milwaukee, Wisconsin, from 13th to 31st; Sandusky, Ohio, from 16th to 31st; Toledo, Ohio, 3d, 4th, and from 17th to 31st.

ATMOSPHERIC ELECTRICITY.

AURORAS.

Auroral displays occurred during December as follows:

Beloit, Wisconsin, 8th: an auroral arch above a dark cloud was observed at 9. 30 p. m.

Fort Totten, Dakota, 8th: an auroral light of pale yellow color, with dark segment beneath, was observed from 9.20 to 11.45 p. m.

Riley, Illinois, 10th.

Saint Vincent, Minnesota, 15th: at 5.30 p. m. a faint auroral display was observed.

Moorhead, Minnesota, 15th: an aurora was observed at 5.15 a. m., consisting of a pale glow and an arch resting upon a dark segment. In the evening on the same day a similar display was observed, appearing at 6.15 and continuing until early morning of the 16th.

Boyne, Michigan, 19th: auroral light extending to an altitude of 15°.

Alpena, Michigan, 19th: an aurora was observed at 9 p. m., consisting of a diffuse light on the northeastern horizon; no streamers were observed; the display ended at 11 p. m.

Escanaba, Michigan, 19th: a faint aurora of pale yellow color was observed from 10 to 10.50 p. m.

Le Roy, New York, 19th: aurora at 8.30 p. m.

Eastport, Maine, 19th: a faint auroral light of straw color was observed from 8 to 10 p. m.

Point Judith, Rhode Island, 20th: an auroral display was observed at 1.13 a. m., consisting of two yellow beams which remained visible twenty minutes; at 2 a. m. a low arch formed which remained until 3 a. m.

Fort Totten, 22d: an aurora in the north with shooting beams of 20° altitude was observed from 9 to 11.50 p. m.

Saint Vincent, Minnesota, 22d: a faint auroral display was noted from 7.10 to 11 p. m.; it consisted of a poorly defined arch of light of 15° altitude, extending over the northern horizon.

Escanaba, Michigan, 22d: an auroral display was visible from 10.15 p. m. until the early morning of the 23d; it consisted of a dark segment beneath a bright yellow light, from which beams extended to an altitude of 45°.

At Harvard College, Cambridge, Massachusetts, auroras were suspected on the following dates: 16th, 3 a. m.; 29th, 11 p. m.; 20th, 8.30 p. m.; 30th, 8.30 p. m.

The "Canadian Weather Review" for December, 1884, reports auroras as follows:

Winnipeg, Manitoba, 8th, 9th, 14th, 15th, 20th, 21st, 22d.

Halifax, Nova Scotia, 14th.

Charlottetown, Prince Edward Island, 14th, 19th, 27th.

THUNDER-STORMS.

Thunder-storms are reported to have occurred in the different states and territories as follows:

Alabama.—Birmingham, 11th, 21st; Greensborough, 20th; Mobile, 22d.

Arizona.—Maricopa, 7th; Tucson, 8th; Wickenburg and Prescott, 7th, 8th; Fort Grant, 7th, 9th; Fort McDowell, 7th, 8th, 9th, 10th, 12th, 26th, 27th.

Arkansas.—Fort Smith, 4th, 26th, 30th; Lead Hill, 5th, 26th, 30th: Mount Ida, 28th, 29th, 30th.

California.—Fort Bidwell, 3d, 21st; Poway, 7th, 11th; Los Angeles, 8th; San Francisco and San Raphael, 24th, 25th; Oakland, 25th; at Salinas City, thunder was occasionally heard from 17th to 24th.